

Portland Harbor Wildlife Restoration Project Criteria

1. Shallow In-Water Habitat (for mainstem river sites)

Definition: Shallow in-water habitat (for mainstem river sites) is defined as that portion of the site (in percent) inundated to a depth of up to 10 feet at approximately Mean Higher High Water (MHHW). The percentage is based on area calculations of the site inundated to a depth of up to 10 feet from existing bathymetry maps (at 0.00 ft NAVD-88) developed by the Lower Willamette Group (LWG).

Rationale (Bald Eagle, Osprey, Spotted Sandpiper, Mink): Due to the presence of various fish species (juvenile salmonids, largescale suckers, walleye, northern pikeminnow, common carp, largemouth bass, smallmouth bass and brown bullhead) in shallow, low velocity, littoral (shoreline) habitat areas, these are important hunting areas for piscivorous predators, such as bald eagles, osprey, spotted sandpipers and mink.

Spotted sandpipers require shallow water habitat or water's edge habitat for hunting.

Criteria:

81-100% of inwater portion within 10-ft depth	= 4
61-80% of inwater portion within 10-ft depth	= 3
41-60% of inwater portion within 10-ft depth	= 2
21-40% of inwater portion within 10-ft depth	= 1
0-20% of inwater portion within 10-ft depth	= 0

2. Tidal Mudflats and Beaches

Definition: Mudflats may be viewed geologically as exposed layers of mud, resulting from deposition silts, clays and animal detritus. Relatively natural shorelines (vs. those with armored banks or seawalls) may support the formation of mudflats or beaches; these areas are typically open or sparsely vegetated, and may contain some organic debris or drift.

Rationale (Spotted Sandpiper and Mink): The diet of spotted sandpipers and mink are made up of high levels of invertebrates. Due to the high level of invertebrate production in tidal mudflats and on debris, they are important foraging areas for these predators.

Criteria:

51-100% relatively natural shoreline with beach or mudflat	= 4
26-50% relatively natural shoreline with beach or mudflat	= 2
0-25% relatively natural shoreline with beach or mudflat	= 0

3. Instream Habitat Structure

Definition: Instream habitat structure includes elements such as large wood and boulders within the in-water portion of a site. For mainstem sites, this is based on a qualitative estimate of the extent of large wood (>10 in. diameter and >10 ft in length) and boulders (>24 in diameter) within in-water portion of the site as determined from site reconnaissance, photos, or reports. A “significant” accumulation of wood or boulders is greater than 10 pieces per 500 ft of shoreline. An accumulation that is “present but not significant” is less than 10 pieces per 500 ft of shoreline. “None” is no wood or boulder present. Where possible for mainstem sites, the scoring is based on a survey by City biologists of wood in the Willamette River in the Portland area and a qualitative categorization of existing conditions into high, medium and low levels. For tributary sites, the scoring is based on an estimate of the extent of large wood within in-water portion of the site considering any available data and surrounding vegetation and land use.

Rationale (Mink): The mink’s diet consists primarily of fish and invertebrates, as well as, amphibians (Verts & Carraway, 1998). Juvenile salmon, lamprey, invertebrates and many amphibians prefer littoral habitat that contain interspersed cover elements such as large wood, boulders or vegetation (e.g., natural bank vegetation, overhanging vegetation, and emergent plants, notably grasses) (summarized in CH2M Hill 2005). Wood is significant because it has an important influence on channel hydraulics and plays an important role in the physical processes associated with pool formation and the flow of sediment, gravel, organic matter, and other materials through the system. Wood also provides cover and feeding stations for juvenile and adult salmon. Loss of wood from streams usually diminishes habitat quality and reduces the carrying capacity for rearing salmon and lamprey during all or part of the year (Hicks et al. 1991). Due to the increased presence of salmon, lamprey, amphibians and invertebrates, in-stream habitat structures are important foraging areas for mink. Logjams are used by mink approximately 55% of the time for hunting aquatic prey (Verts & Carraway, 1998)

Criteria

Significant	= 4
Significant in some areas	= 3
Present but not significant	= 2
None	= 0

4. Off-channel Habitat Proximity

Definition: Off-channel habitat proximity is defined as the proximity or connectivity of the site to existing or newly-created off-channel habitats, or previously inaccessible upstream habitat. It is rated based on the acres of existing off-channel or secondary channel habitat that is connected to or adjacent to the site. Alternatively, it is rated based on the acres of previously inaccessible upstream habitat such as in the case of culvert replacements. Existing off-channel or secondary channel habitat has been estimated for the lower Willamette River via GIS analysis by City staff.

Rationale (Mink): Due to the presence of fish in backwaters along the edge of the channel and in side-channel areas (Sewell and Beschta 1991), these habitats are important foraging habitat for mink.

Criteria:

Proximal off-channel habitat >5 acres	= 4
Proximal off-channel habitat 1-5 acres	= 3
Proximal off-channel habitat <1 acres	= 2
No proximal off-channel habitat	= 0

5. Off-Channel Habitat Quality

Definition: Off-channel habitat quality is defined as the quality of existing or newly-created off-channel habitat, or previously inaccessible upstream habitat. It is rated based on an estimate of the quality of the existing or newly-created off-channel habitat or previously inaccessible upstream habitat that is connected to or adjacent to the site based on site knowledge, reconnaissance, photos or reports. Off-channel habitat that is seasonally inundated with good habitat and water quality attributes is considered to have 'high' quality. Off-channel habitat that is infrequently inundated with degraded habitat and water quality attributes is considered to have 'low' quality. Off-channel habitat that is intermediate between the high and low categories is of 'moderate' quality.

Rationale (Mink): The basic rationale is the same as summarized above for Off-Channel Habitat Proximity. It is recognized that the quality of the existing or newly-created off-channel habitat, or previously inaccessible upstream habitat, is an important determinant of the habitat's usability and productivity. Perhaps the single most effective habitat-oriented action for salmon sustainability is to protect existing high quality habitat (Lichatowich et al. 2000). Due to the presence of juvenile salmon in high quality off channel habitat, this is an important foraging habitat for mink.

Criteria:

High habitat quality	= 4
Moderate habitat quality	= 3
Low habitat quality	= 1
No off-channel habitat present	= 0

6. Floodplain Connectivity

Definition: Floodplain connectivity is the hydrological connection between floodplains and their associated waterways from periodic inundation during flood events. For the purposes of scoring this factor, the potential floodplain at a site is defined as any former floodplains known to have been filled or blocked by dikes and levees, streamside areas within 25 feet on either side of a water body, and the current (i.e., functionally connected)

floodplain. Functionally connected floodplains are defined as the combined extent of the current FEMA 100-year floodplain, 1996 flood extent data, and restored floodplain areas.

Rationale (Mink): There is an increasing recognition that floodplains play a major role in the productivity and diversity of riverine communities (Bailey 1995). Annual inundation is the principal force determining productivity and biotic interactions in river-floodplain systems. Large, infrequent floods can play important roles in shaping channels, transporting and depositing bed material within the stream and on the floodplain, dispersing vegetation and woody debris and recharging floodplain aquifers (Spence *et al.* 1996). Flooding is a natural disturbance regime that can reset the natural succession of riparian vegetation, bringing about early successional communities that contribute to habitat heterogeneity. Floodplains can provide higher biotic diversity and increased production of fish and wildlife through increased habitat diversity and area. Most of the historic off-channel and floodplain habitat has been disconnected from the river by diking and hardening of channel banks. Loss of these off-channel habitats limits rearing and over-wintering habitat for juvenile salmon and has reduced depositional areas used by lamprey in the lower Willamette River. Due to the increased invertebrate and fish production in floodplain habitat, it is important foraging habitat for minks. Floodplain vegetation and structure can also provide habitat for mink den sites, and movement and dispersal corridors.

Criteria:

>65% of the potential floodplain at the site is functionally connected	= 4
>35% and <65% of the potential floodplain at the site is functionally connected	= 2
35% or less of the potential floodplain at the site is functionally connected	= 0

7. Natural Streambank

Definition: Natural streambank is defined as the percent of lineal amount of bank along the site that is natural (e.g., beach, vegetated), and not hardened with riprap, sheet pilings, walls, or other means. The bank is that portion of the channel margin from approximately MHHW to top-of-bank. The percentage is based on a gross estimate (to the nearest 20 percent) of bank area at the site that is mostly natural or not hardened.

Rationale (Spotted Sandpiper, Mink): Channelization and bank hardening reduce habitat diversity by reducing shoreline complexity and deformity. Natural stream banks have a higher level of vegetation and invertebrate production. For these reasons, higher percentages of bank in all or mostly natural conditions are preferred. Spotted sandpipers require mudflats associated with natural stream banks for foraging habitat. Due to the high levels of invertebrate production in natural stream banks, this is important foraging habitat for sandpipers and minks. The criteria assumed in the scoring system are based on a gross estimate (to the nearest 20 percent) of bank area at the site that is mostly natural or not hardened. The specific criteria were developed from professional judgment, and project rankings based on information from the ODFW Fish Study bank

composition survey (ODFW 2002) and ODFW habitat surveys of Portland tributaries (1999-2001).

Criteria:

≥65% of bank along site all or mostly natural, not hardened	= 4
>35% to <65% of bank natural or unhardened condition	= 2
35% or less of bank natural or unhardened condition	= 0

8. Streambank Slope

Definition: Streambank slope is defined as the average bank slope along the site, in percent to the nearest 20 percent. The average bank slope is determined as the lateral bank gradient from MHHW to top-of-bank from existing site topography and bathymetry maps (based on NAVD-88).

Rationale (Mink): Bank slope is an important determinant of bank and riparian stability, as well as shoreline habitat diversity and complexity. For example, a vertical bank generally lacks the habitat structure preferred by rearing salmon, and oversteepened banks are more prone to soil failure and wasting. Bank slope is also an important factor for wildlife movement, such as, mink. Steep slopes make it difficult for mink for access invertebrates, amphibians and fish for hunting. In the mainstem Willamette River, the bank slope from above the approximately MHHW provides an accurate approximation of bank slope over a range of conditions of seasonal flow variations and tidal influence in the lower Willamette River. The specific criteria were developed from professional judgment, and project rankings based on information from the ODFW Fish Study bank composition survey (ODFW 2002) and calculations from City GIS data on 2-ft and 5-ft contours.

Criteria:

Average bank slope less than 40%	= 4
Average bank slope 40-60%	= 2
Average bank slope more than 60%	= 0

9. Quantity of Riparian Vegetation

Definition: Quantity of riparian vegetation is the percent of vegetated riparian forest within 300 ft or in the floodplain area on the site. It is based on an estimate of the percent of vegetated riparian forest that is above MHHW and within 300 ft of the river channel or in the floodplain area on the site. The assumed 300-ft width is based on City of Portland E zone and Metro Goal 5 guidance (City of Portland Bureau of Planning 2001, Metro 2002).

Rationale (Mink): Riparian corridors provide some of the most important avian habitats because of their vegetation, proximity to water, and connectivity to larger habitat areas

with and without the urban landscape. Bird abundance and diversity are typically higher near streams, especially in urban areas. Local research has found that roughly 93 percent of native birds found in the Portland-Metro region use streamside habitats (Hennings and Edge 2003). This research has found that narrower riparian corridors support greater numbers of non-native birds that compete with and prey upon native birds. Riparian areas also support 60-80% of all Oregon vertebrates for at least one stage of their life cycle. The mink is typically associated with riparian habitats, including small streams, tidal flats, cattail marshes, rivers, lakes, bogs, swamps and bottomland woods (Allen 1986).

Riparian zones provide key contributions to the health of aquatic habitats by providing shade, thus decreasing water temperatures, streambank stabilization, sediment control, leaf litter input, large wood, and nutrients (Spence et al. 1996). Riparian vegetation provides long-term ecosystem function by anchoring streamside soils, providing overhanging and undercut streambanks, increasing habitat complexity, enhancing flows between instream and hyporheic zones, and supplying large wood (Beschta 1997).

The specific criteria for this indicator were developed from professional judgment based on the City of Portland E zone and Metro Goal 5 guidance (City of Portland Bureau of Planning 2001, Metro 2002). Project rankings were based on estimates of vegetated riparian forest area derived from City of Portland June 2002 multi-spectral remote sensing data.

Criteria

>75%	= 4
>50 to 75%	= 3
>25 to 50%	= 2
>10 to 25%	= 1
10% or less	= 0

10. Perch Sites

Definition: The number of large trees is defined by the number of trees that could be used as perch sites for bald eagles and osprey. Trees are characterized by having large trunk forks or multiple forks of the trunk within 2 miles of a fish-bearing water body.

Rationale (Bald Eagle and Osprey): Migrant and wandering bald eagles roosts singly or in groups in suitable trees adjacent to hunting areas (Marshall *et al.* 2006). Osprey historically nested only in forested regions due to the requirement for large live trees and snags. These trees are usually located within 2 miles of a large water body. Nest and perch sites are now limited due to previous conversion of forest land to agriculture and housing development. Due to the limited availability of large trees for nest and perch sites, Osprey will use channel markers and utility poles for nest sites (Marshall *et al.* 2006). Protecting and restoring areas with suitable nest and perch sites are important to retain and expand historical nesting habitat along the Willamette River.

Criteria:

At least 1 large tree per $\frac{1}{4}$ acre within range of a fish-bearing water body = 4

At least 1 large tree per $\frac{1}{2}$ acre within range of a fish-bearing water body = 2

< 1 large tree per $\frac{1}{2}$ acre within range of a fish-bearing water body = 0

11. Nest Sites for Bald Eagle and Osprey

Definition: The presence of large trees that can be used as nesting sites for bald eagles and osprey. Trees are characterized by having large trunk forks or multiple forks of the trunk within 2 miles of fish-bearing water body. Trees are present with a surrounding buffer of additional trees.

Rationale (Bald Eagle): Bald eagles primarily nest in forested areas within 2 miles of a fish-bearing water body. Nests observed in Oregon have been in Sitka spruce and Douglas-fir west of the Cascades. Columbia and Willamette River populations have shown an increase in the use of black cottonwood for nesting. Minimizing disturbance is important for successful hunting, feeding of young and nesting. Protecting and enhancing nest sites with buffer zones would minimize disturbance.

Rationale (Osprey): Osprey historically nested only in forested regions due to the requirement for large live trees and snags. These trees are usually located within 2 miles of a large water body. Nest and perch sites are now limited due to previous conversion of forest land to agriculture and housing development. Due to the limited availability of large trees for nest and perch sites, Osprey will use channel markers and utility poles for nest sites (Marshall *et al.* 2006). The installation of nesting platforms designed for osprey may be considered on a site-by-site basis as a restoration strategy. Protecting and restoring areas with suitable nest and perch sites are important to retain and expand historical nesting habitat along the Willamette River.

Criteria:

$\geq \frac{1}{4}$ acre patch of mature trees within range of a fish-bearing water body = 4

$\geq \frac{1}{4}$ acre patch of young trees within range of a fish-bearing water body = 2

< $\frac{1}{4}$ acre patch of trees within range of a fish-bearing water body = 0

Note: Installing a nesting platform for osprey in a suitable location could qualify for a score of “4” for osprey. This option is not currently reflected in the wildlife scores, but may be considered on a site-by-site basis as projects are developed.

12. Presence of Native Vegetation

Definition: Presence of native vegetation is determined by presence of both overstory and understory native vegetation in the floodplain and riparian zone. It is based on a

qualitative estimate of the extent of native vegetation within the floodplain and riparian zone at the site based on site knowledge, reconnaissance, photos or reports.

Rationale (Spotted Sandpiper, Mink): Many riparian habitats have been affected by the invasion of non-native plants and introduced animals. On many sites, these non-native species have become well established, commonly replacing native species or exerting large influences on the functional dynamics of existing native habitats. Therefore, the presence and dominance of native plant species in riparian areas is considered an important indicator of riparian quality and health. Native riparian vegetation provides long-term stability to the river bank, and contributes to the development and maintenance of complex habitat important for foraging habitat for mink. Native riparian vegetation provides necessary cover habitat for spotted sandpipers. The specific criteria and project rankings for this indicator were developed from professional judgment based on riparian vegetation information in reports by Adolphson (2000), Parametrix (2003), and ODFW habitat surveys of Portland tributaries (1999-2001).

Criteria:

Dominated by native vegetation	= 4
Some native vegetation	= 2
No native vegetation	= 0

13. Presence of Wetlands with Surface Water

Definition: The presence of surface water for a percentage of the year. Surface water habitats include palustrine emergent wetlands (marshes) and open water, such as, streams, ponds and lakes).

Rationale (Mink): Five key habitat types of importance to wildlife are directly associated with riparian areas along the lower Willamette River as identified in the Willamette River Inventory – Natural Resources (City of Portland Bureau of Planning 2003). These include open water, beach bottomland forest, emergent wetland, shrub/scrub wetland. This indicator represents two of these habitat types that are of added importance to a variety of native birds, reptiles and amphibians along the city's watercourses. Preferred mink habitats are generally shallow and deep marshes and ponds. Suitable mink habitat also includes palustrine and estuarine wetland systems (Allen 1986). It is assumed that surface water must be present for a minimum of nine months of the year to provide optimum foraging habitat for mink. Habitats with less permanent surface water are assumed to be less suitable mink habitat. Wetland habitats consisting only of saturated soils or lacking surface water are assumed to be of no value as year-round mink habitat (Allen 1986).

Criteria:

Presence of surface water 9-12 months	= 4
Presence of surface water 5-8 months	= 3
Presence of surface water 2-4 months	= 2

Presence of surface water 0-1 months	= 1
No surface water/no wetland	= 0

14. Staging Areas

Definition: During migration, shorebirds, such as, spotted sandpipers rely on staging areas to meet the energy demands of their migrations. Habitats used for staging areas are usually shallow wetlands with mudflats that are surrounded by short, sparse vegetation (WetNet 1999). Western Sandpipers also use dry or flooded agricultural lands during northward migration (Wilson 1994). Since spotted sandpipers don't migrate in large groups, even small restoration projects along the Willamette River might be able to provide important areas for foraging and resting in preparation for or during migration as individuals or small groups. During migration and winter, they can be found almost anywhere near water, including mudflats, beaches, breakwaters, sewage ponds, and even in irrigation ditches. They prefer fresh water, but can also be found along salt water during migration. Shorelines and riverine areas are important for species that generally do not occur in large concentrations. Riverine areas are particularly important for Spotted Sandpipers and exposed shorelines of shallow ponds and lakes are valuable habitats for shorebirds such as Solitary Sandpiper and Semipalmated Plover. Shoreline use occurs primarily during fall migration when typically lower water levels create opportunities for foraging (Drut 2000).

Rationale (Spotted Sandpiper): Migration staging areas and breeding sites are the most important components of shorebird habitat needs. Shorebirds rely on these staging areas to meet the energy demands of their migrations (Thurston 1996). The greatest risk to shorebird migration and to their critical breeding grounds is habitat change through degradation, fragmentation, and loss, which results from human disturbances and expanding development. Shorebirds are highly dependent on the resources found at the staging areas along their migrations (Environment Canada 1999). Many species concentrate together at these relatively limited staging areas along their extensive migratory routes. This makes them very vulnerable to environmental change, particularly when large percentages of entire populations gather in one place at one time. Human disturbance has had direct, measurable effects on shorebirds (Thurston 1996).

Criteria (Size of Available Habitat for Staging Areas Within the Pacific Flyway):

≥ 5 acres	= 4
2.1 - 5 acres	= 3
0.6 - 2 acres	= 2
0.1 - 0.5 acres	= 1
0 acres	= 0

15. Water/Shoreline/Upland Connectivity to Other Habitats

Definition: Connectivity between habitats provides access between various foraging locations and den sites. For this criterion, connectivity is evaluated in each primary direction of potential wildlife movement. For example, connectivity for sites along the Willamette River is considered upstream, downstream, toward any upland habitats, and toward the river.

Rationale (Mink): Although mink are considered non-migratory, they will travel distances up to 7.5 mi between forage locations and den sites (Whitaker and Hamilton 1998). Mink will use upland habitat if sufficient cover and prey are available (Degraaf and Yamasaki 2001).

Criteria:

Connectivity promoting wildlife movement from the project site in 4 directions	= 4
Connectivity promoting wildlife movement from the project site in 3 directions	= 3
Connectivity promoting wildlife movement from the project site in 2 directions	= 2
Connectivity promoting wildlife movement from the project site in 1 direction	= 1
No connectivity in any direction	= 0

16. Cover

Mink

Definition: The percentage of tree, shrub, and/or persistent emergent herbaceous vegetation canopy closure.

Rationale (Mink): Mink are most often found in close association with wetland cover types and the vegetative communities immediately adjacent to streams, rivers, and lakes. Optimum cover is assumed when woody cover within 330 ft of the water's edge is $\geq 75\%$ (Allen 1986). Dense woody cover provided by trees and/or shrubs provides the mink with potential den sites, escape cover, and foraging cover. Persistent herbaceous cover may also provide mink with sufficient cover for foraging and shelter.

Criteria (Percent Canopy Closure within 330 ft of a Waterbody):

81-100% Canopy Closure	= 4
61-80% Canopy Closure	= 3
41-60% Canopy Closure	= 2
21-40% Canopy Closure	= 1
0-20% Canopy Closure	= 0

Spotted Sandpiper

Definition: Spotted sandpipers use a mosaic of habitats that include open and semiopen areas with herbaceous ground cover (generally vegetation less than 2' tall). For this

criterion, significant habitat value is defined as semiopen areas with herbaceous cover that are relatively undisturbed near water and patches of more dense vegetation. Semiopen habitats with herbaceous cover that are low value include areas that are heavily disturbed, or that are not near water or patches of more dense vegetation. Habitat that is scored as insignificant includes areas that do not support any notable patches of herbaceous cover, or areas that are too densely vegetated (i.e., 75-100% herbaceous cover, such as monotypical stands of reed canarygrass).

Rationale (Spotted Sandpiper): Fairly open areas with some herbaceous cover are important elements of spotted sandpiper habitat. Oring and Knudson stated that spotted sandpipers nest in sparsely vegetated areas and Bent (1929) stated that spotted sandpipers will not nest in densely wooded areas. According to Oring et al. (1997), “Females normally defend all-purpose territory that includes (1) shoreline (stream or lake) for foraging, drinking, bathing, and displaying; (2) semiopen habitat for nesting; and (3) patches of dense vegetation for brood cover (Maxson and Oring 1980, Oring et al. 1983).” The authors state that in urban areas, they can also breed in fields, lawns and parks. Allard (2001) defined areas with herbaceous ground cover ranging from 10-50% as optimal for nesting cover in a spotted sandpiper suitability index.

Criteria:

Herbaceous cover present and provides significant habitat value	= 4
Herbaceous cover present, but provides low habitat value	= 2
Herbaceous habitat not present or is insignificant	= 0

17. Patch Size

Mink

Definition: Any wetland or wetland associated habitat that has connectivity to a suitable den site.

Rationale: Minimum habitat area is defined as the minimum amount of contiguous habitat that is required before an area will be occupied by a species. The size and shape of mink home ranges vary in response to topography and food availability. Home ranges of both sexes tend to parallel the configuration of a body of water or wetland basin. Based on this information, it is assumed that any wetland, or wetland associated habitat, large enough to be identified and evaluated as such, has the potential to support mink. Mink move back and forth in a core area to forage, which is located adjacent to the den site (Allen 1986). The area is typically does not exceed 300 meters in shoreline length (Gerrell 1970).

Criteria: Patch size of suitable habitat for foraging and denning

≥ 50 acres	= 4
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20 - 49.9 acres	= 3
10 - 19.9 acres	= 2
0.1 - 9.9 acres	= 1
0 acres	= 0

Spotted Sandpiper

Definition: Spotted sandpipers occupy almost all habitats near water. For breeding, females normally defend territories that include 1) shoreline for foraging, drinking, bathing, and displaying, 2) semi-open habitat for nesting, and 3) patches of dense vegetation for brood cover (Maxson and Oring 1980, Oring *et al.* 1983 as cited in Oring *et al.* 1997, p. 5).

Rationale: Female breeding territories often include territories of one or more males. Research has found territory sizes ranging from approximately 0.01 to 0.34 acres at a study area in Minnesota, up to between approximately 0.74 to 4.94 acres at a study area in New York. In some cases, spotted sandpipers have been found nesting within 5 meters of each other. Territory sizes tend to increase in size with higher levels of predation and lower food resources (Oring *et al.* 1997, p. 11).

Criteria: Habitat patch size; habitat must include or be connected to a shoreline area.

≥ 5 acres	= 4
2.1 - 5 acres	= 3
0.6 - 2 acres	= 2
0.1 - 0.5 acres	= 1
0 acres	= 0

Bald Eagle

Definition: The area immediately surrounding the nest site.

Rationale: Bald eagles are sensitive to human disturbance. Protection from human disturbance is important for successful hunting, feeding of young and nesting (Marshall 2006). Based on this information, the U.S. Fish and Wildlife Service require a minimum 0.25 mile line-of-sight buffer to protect bald eagles from disturbance.

Criteria: Line-of-sight Distance (miles)

1.1 - 2.0 miles	= 4
0.25 - 1.0 miles	= 2
0 - 0.24 miles	= 0

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